conjunction with a genetic vaccine. The choice of vector and components can also be optimized for the particular purpose of treating allergy or other conditions. In one aspect, the optimized genetic vaccine components are used in conjunction with other optimized genetic vaccine reagents. For example, an antigen that is useful for a particular condition can be optimized by methods analogous to the reassembly (&/or one or more additional directed evolution methods described herein) and screening methods described herein.

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The polynucleotide that encodes the recombinant antigenic polypeptide can be placed under the control of a promoter, e.g., a high activity or tissue- specific promoter. The promoter used to express the antigenic polypeptide can itself be optimized using reassembly (&/or one or more additional directed evolution methods described herein) and selection methods analogous to those described herein., as described in International Application No. PCTIUS97/17300 (International Publication No. WO 98/13487).

The vector can contain immunostimulatory sequences such as are described herein. A vector engineered to direct a T_H1 response can be used for many of the immune responses mediated by the antigens described herein. The reagents obtained using the methods of the invention can also be used in conjunction with multicomponent genetic vaccines, which are capable of tailoring an immune response as is most appropriate to achieve a desired effect. It is sometimes advantageous to employ a genetic vaccine that is targeted for a particular target cell type (e.g., an antigen presenting cell or an antigen processing cell); suitable targeting methods are described herein.

Delivery of genetic vaccines and delivery vehicles to mammals in vivo and ex vivo

Genetic vaccines, (e.g. genetic vaccines that include the optimized experimentally generated polynucleotides obtained as described herein, such as genetic vaccines that encode the multivalent antigens described herein, including the multicomponent genetic vaccines described herein), can be delivered to a mammal (including humans) to induce a therapeutic or prophylactic immune response. Vaccine delivery vehicles can be delivered *in vivo* by administration to an individual patient, typically by systemic administration (e.g., intravenous, intraperitoneal, intramuscular, subdermal, intracranial, anal, vaginal, oral, buccal route or they can be inhaled) or they can be administered by topical application.

Alternatively, vectors can be delivered to cells ex vivo, such as cells explanted from an individual patient (e.g., lymphocytes, bone marrow aspirates, tissue biopsy) or universal

donor hematopoietic stem cells, followed by reimplantation of the cells into a patient, usually after selection for cells which have incorporated the vector.

Delivery methods and references

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A large number of delivery methods are well known to those of skill in the art. Such methods include, for example liposome-based gene delivery (Debs and Zhu (1993) WO 93/24640; Mannino and Gould-Fogerite (1988) BioTechniques 6(7): 682-691; Rose U.S. Pat No. 5,279,833; Brigham (1991) WO 91/06309; and Felgner et al. (1987) Proc. Natl. Acad. Sci. USA 84: 7413-7414), as well as use of viral vectors (e.g., adenoviral (see, e.g., Berns et al. (1995) Ann. NY Acad Sci. 772: 95-104; Ali et al. (1994) Gene Ther. 1: 367-3 84; and Haddada et al. (1995) Curr. Top. Microbiol. Immunol. 199 (Pt 3): 297-306 for review), papillomaviral, retroviral (see, e.g., Buchscher et al. (1992) J Virol. 66(5) 2731-2739; Johann et al. (1992) J Virol. 66 (5):163 5-1640 (1992); Sommerfelt et al., (1990) Virol. 176:58-59; Wilson et al. (1989) J Virol. 63:2374-2378; Miller et al., J Virol. 65:2220-2224 (1991); Wong-Staal et al., PCT/US94/05700, and Rosenburg and Fauci (1993) in Fundamental Immunology, Third Edition, Paul (ed) Raven Press, Ltd., New York and the references therein, and Yu et al., Gene Therapy (1994) supra.), and adeno-associated viral vectors (see, West et al. (1987) Virology 160:3 8-47; Carter et al. (1989) U. S. Patent No. 4,797,3 68; Carter et al. WO 93/24641 (1993); Kotin (1994) Human Gene Therapy 5:793 - 801; Muzyczka (1994) J Clin. Invst. 94:1351 and Samulski (supra) for an overview of AAV vectors; see also, Lebkowski, U.S. Pat. No. 5,173,414; Tratschin et al. (1985) Mol. Cell. Biol. 5(11):3251-3260; Tratschin, et al. (1984) Mol. Cell. Biol., 4:2072- 2081; Hermonat and Muzyczka (1984) Proc. Natl. Acad Sci. USA, 81:6466-6470; McLaughlin et al. (1988) and Samulski et al. (1989) J Virol., 63:03 822-3 828), and the like.

Introduction of "Naked" DNA and/or RNA that comprises a genetic vaccine directly into a tissue or using "biolistic" or particle-mediated transformation, both in vivo and ex vivo

"Naked" DNA and/or RNA that comprises a genetic vaccine can be introduced directly into a tissue, such as muscle. See, e.g., USPN 5,580, 859. Other methods such as "biolistic" or particle-mediated transformation (see, e.g., Sanford et al., USPN 4,945,050; USPN 5,036,006) are also suitable for introduction of genetic vaccines into cells of a mammal according to the invention. These methods are useful not only for *in vivo* introduction of DNA into a mammal, but also for ex vivo modification of cells for reintroduction into a mammal. As for other methods of delivering genetic vaccines, if

necessary, vaccine administration is repeated in order to maintain the desired level of immunomodulation.

SUMMARY OF TABLES 1-85

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These tables show preferred, but non-limiting, examples of 3-base long mutagenic cassettes that are non-stochastic and degenerate.

Table #	Triplet Sequence	Site 1	Site 2	Site 3
1.	N,N,G/T	N	N	G/T
2.	N,N,G/C	N	N	G/C
3.	N,N,G/A	N	N	G/A
4.	N,N,A/C	N	N	A/C
5.	N,N,A/T	N	N	A/T
6.	N,N,C/T	N	N	C/T
7.	N,N,N	N	N	N
8.	N,N,G	N	N	G
9.	N,N,A	N	N	A
10.	N,N,C	N	N	C
11.	N,N,T	N	N	T
12.	N,N,C/G/T	N	N	C/G/T
13.	N,N,A/G/T	N	N	A/G/T
14.	N,N,A/C/T	N	N	A/C/T
15.	N,N,A/C/G	N	N	A/C/G
16.	N,A,A	N	A	A
17.	N,A,C	N	A	C
18.	N,A,G	N	A	G
19.	N,A,T	N	Α	T
20.	N,C,A	N	С	A
21.	N,C,C	N	С	C
22.	N,C,G	N	С	G
23.	N,C,T	N	С	T
24.	N,G,A	N	G	A
25.	N,G,C	N	G	C
26.	N,G,G	N	G	G
27.	N,G,T	N	G	T
28.	N,T,A	N	T	A
29.	N,T,C	N	T	С
30.	N,T,G	N	T	G
31.	N,T,T	N	T	T
32.	N,A/C,A	N	A/C	Α
33.	N,A/G,A	N	A/G	A
34.	N,A/T,A	N	A/T	A
<i>35</i> .	N,C/G,A	N	C/G	A
36.	N,C/T,A	N	C/T	A
37.	N,T/G,A	N	·T/G	A
38.	N,T/G,A N,C/G/T,A	N	C/G/T	A
39.	N,A/G/T,A	N	A/G/T	A
40.	N,A/C/T,A	N	A/C/T	Ā
41.	N,A/C/G,A	N	A/C/G	A
42.	A,N,N	A	N	N

Table #	Triplet Sequence	Site 1	Site 2	Site 3
43.	C,N,N	С	N	N
44.	G,N,N	G	N	N
45.	T,N,N	T	N	N
46.	A/C,N,N	A/C	N	N
47.	A/G,N,N	A/G	N	N
48.	A/T,N,N	A/T	N	N
49.	C/G,N,N	C/G	N	N
50.	C/T,N,N	C/T	N	N
51.	G/T,N,N	G/T	N	N
52.	N,A,N	N	A	N
53.	N,C,N	N	С	N
54.	N,G,N	N	G	N
55.	N,T,N	N	T	N
56.	N,A/C,N	N	A/C	N
57.	N,A/G,N	N	A/G	N
58.	N,A/T,N	N	A/T	N
59.	N,C/G,N	N	C/G	N
60.	N,C/T,N	N	C/T	N
61.	N,G/T,N	N	G/T	N
62.	N,A/C/G,N	N	A/C/G	N
63.	N,A/C/T,N	N	A/C/T	N
64.	N,A/G/T,N	N	A/G/T	N
65.	N,C/G/T,N	N	C/G/T	N
66.	C,C,N	С	C	N
67.	G,G,N	G	G	N
68.	G,C,N	G	C	N
69.	G,T,N	G	T	N
70.	C,G,N	C	G	N
71.	C,T,N	С		N
72.	T,C,N	T	T C	N
73.	A,C,N	A	C	N
74.	G,A,N	G	Α	N
<i>75</i> .	A,T,N	A	T	N
76.	C,A,N	С	A	N
77.	T,T,N	T	T	N
78.	A,A,N	A	A	N
79.	T,A,N	T	Α	N
80.	T,G,N	T	G	N
81.	A,G,N	Α	G	N
82.	G/C,G,N	G/C	G	N
83.	G/C,C,N	G/C	C	N
84.	G/C,A,N	G/C	A	N
85.	G/C,T,N	G/C	T	N

TABLE 1. N, N, G/T

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	2	NONPOLAR	15
GGC	NO	1		(NPL)	
GGA	NO	-[
GGG	YES				
GCT	YES	ALANINE	2		
GCC	NO				
GCA	NO	4			
GCG	YES		<u> </u>		
GTT	YES	VALINE	2		
GTC	NO				
GTA	NO	_			
GTG	YES				
TTA	NO	LEUCINE	3		
TTG	YBS	4	1		
CIT	YES	-	i		
CTC	NO NO	-			
CTA	YES				
ATT	YES	ISOLEUCINE			
ATC	NO	MONTH OF THE	*		
	NO	1			
ATA ATG	YES	METHIONINE	1		
TTT	YES	PHENYLALANINE			
TTC	NO	T THE TANKS IN THE	^		
TGG	YES	TRYPTOPHAN	1		
CCT	YES	PROLINE	2		
CCC	NO	LVATURE	L		
CCA	NO	-			
CCG	YES				
		OFFICE		DOT AN	9
TCT	YES	SERINE	3	POLAR NONIONIZABLE	y
TCC TCA	NO NO	1		(POL)	
TCG	YES	1		V7	
AGT	YES	1			
AGC	NO				
TGT	YES	CYSTEINE	1		
TGC	NO				
AAT	YES	ASPARAGINE	. 1		
AAC	NO				
CAA	NO	GLUTAMINE	1		
CAG	YES				
TAT	YES	TYROSINE	1		
TAC	NO				
ACT	YES	THREONINE	2		
ACC	NO	-			
ACA ACG	NO YES	1			
		145		Martin I are as a second	
GAT	YES	ASPARTIC ACID	l.	IONIZABLE: ACIDIC NEGATIVE CHARGE	2
GAC	NO	CITITAL SIGNATURE		NEGATIVE CHARGE (NEG)	
GAA GAG	NO YES	GLUTAMIC ACID	1	(a 100-4)	
بك ليجان عاد الماليات الأنا		13/07/17	1	TONEY ANT E. DAGG	
AAA AAG	NO	LYSINE	1	IONIZABLE: BASIC POSITIVE CHARGE	5
CGT	YES	ADCINIDE	3	(POS)	
CGC	YES	ARGININE	3	(*)	
CGA	NO	-			
CGG	YES	1			
AGA	NO	7			
AGG	YES				
CAT	YES	HISTIDINE	1		
CAC	NO				
TAA	NO	STOP CODON	1	STOP SIGNAL	1
TAG		1.0.000		(STP)	-
E 44	YES	-			
		_			
TGA 64	NO			NPL:POL:NEG:F	

TABLE 2. N, N, G/C

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequen
GGT	NO	GLYCINE	2	NONPOLAR	15
GGC	YES			(NPL)	13
GGA	NO	_			
GGG	YES				
GCT	NO	ALANINE	2		
GCC	YES				
GCA	NO		·	i i	
GCG	YES			•	
GTT	NO	VALINE	2	i	
GTC	YES		•		
GTA	NO		i		
GTG	YES	7			
TTA	NO	LEUCINE			
TIG	YES		3		
CIT	NO				
CTC	YES	7			
CTA	NO	7			
CTG	YES				
ATT	NO	ISOLEUCINE	1		
ATC	YES		*		
ATA	NO	7			
ATG	YES	METHIONINE			
TIT	NO				
TTC	YES	PHENYLALANINE	1		
TGG	فالمواوي والمستوات والأكاث				
CCT	YES	TRYPTOPHAN	1		
	NO	PROLINE	2		
CCC	YES		I		
CCA	NO	<u>.</u>			
CCG	YES				
TCT	NO	SERINE	3	POLAR	
TCC	YES		1	NONIONIZABLE	9
TCA	NO	1	i	(POL)	
TCG	YES	}	<u> </u>	(202)	
AGT	NO				
AGC	YES				
TGT	NO	CYSTEINE	1		
TGC	YES				
TAA	NO	ASPARAGINE	1		
AAC	YES				
CAA	NO	GLUTAMINE	1		
CAG	YES				
TAT	NO	TYROSINE	1		
TAC	YES				
ACT	NO	THREONINE	2		
ACC	YES				
ACA	NO		1		•
ACG	YES				
GAT	NO	ASPARTIC ACID	1	IONIZABLE: ACIDIC	
GAC	YES			NEGATIVE CHARGE	2
GAA	NO	GLUTAMIC ACID	1	(NEG)	
GAG	YES	· <u> </u>	Ī		
AAA	NO	LYSINE		TOMOZANEN -	
AG	YES		* 1	IONIZABLE: BASIC	5
GT	NO	ARGININE	3	POSITIVE CHARGE (POS)	
GC	YES	- **** 1988 1665	3	(4 00)	
GA	NO		į		
egg	YES		ļ		
GA	NO		i		
.GG	YES				
AT	NO	HISTIDINE	1		
AC	YES		•		
AA	NO	STOP CODON			
AG	YES	~~~~!\	1	STOP SIGNAL	1
			1	(STP)	
GA	NO				
54	32	20 Amino Acids	Ass	NPL:POL:NEG:PO	
}~ }					

TABLE 3. N, N, G/A

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	NO	GLYCINE	2	NONPOLAR	15
GGC	NO			(NPL)	
GGA	YES]			
GGG	YES				
GCT	NO	ALANINE	2		
,GCC	NO	1			
GCA	YES	1			
GCG	YES	7			
GTT	NO	VALINE	2		
		VALUE	-		
GTC	NO	-			
GTA	YES	4			
GTG	YES	<u> </u>			
TTA	YES	LEUCINE	4		
TTG	YES	_			
CIT	NO	1			
CTC	NO				
CTA	YES				
CTG	YES		ووالياسندان والتناطية بيون بين		
ATT	NO	ISOLEUCINE	I		
ATC	NO				
ATA	YES	1			
ATG	YES	METHIONINE	1		
TIT	NO	PHENYLALANINE	0		
		THE TENEDALING			
TTC	NO				
TGG	YES	TRYPTOPHAN	1		·
CCT	NO	PROLINE	2		
CCC	NO				
CCA	YES				
CCG	YES	1			
TCT	NO	SERINE	2	POLAR	6
TCC	NO	SEKTIVE	4	NONIONIZABLE	U
TCA	YES			(POL)	
TCG	YES	4		(202)	
AGT	NO	-			
AGC	NO				
TGT		CYSTEINE	0		
TGC	NO NO	CISIEME	· ·		
AAT		ASPARACENTS	0		
AAC	NO	ASPARAGINE	· ·		
والمراجعت المراجعت	NO	OF STRANGE			
CAA	YES	GLUTAMINE	2		
CAG	YES				
TAT	NO	TYROSINE	0		
TAC	NO				
ACT	NO	THREONINE	2		
ACC	NO				
ACA	YES	4			
ACG	YES				
GAT	NO	ASPARTIC ACID	0	IONIZABLE: ACIDIC	2
GAC	NO			NEGATIVE CHARGE	
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES				
AAA	YES	LYSINE	2	IONIZABLE: BASIC	6
AAG	YES	225010	£	POSITIVE CHARGE	•
CGT	NO	ARGININE	A	(POS)	
CGC	NO	WORITE.	4	<u> </u>	
CGA	والواوان والمتاريخ والمتناطق والمتاريخ والمتاريخ والمتارك والمتارك والمتارك والمتارك والمتارك والمتارك	4			
CGG	YES	4			
AGA	YES	-{			
AGG	YES	-{			
	YES	The state of the s			
CAT	NO	HISTIDINE	0	•	
CAC	NO				
TAA	YES	STOP CODON	3	STOP SIGNAL	3
	YES			(STP)	
		-1			
TAG					
	YES	14 Amino Ac		NPL:POL:NEG:P	

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TABLE 4. N, N, A/C

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	NO	GLYCINE	2	NONPOLAR	14
GGC	YES			(NPL)	
GGA	YES				
GGG	NO				
GCT	NO	ALANINE	2		
GCC	YES				
GCA	YES	4			
GCG	NO				
GIT	NO	VALINE	2		
GIC	YES				
GTA	YES]			
GTG	NO				
TTA	YES	LEUCINE	3		
TTG	NO		/.		
CIT	NO				
CTC	YES				
CTA CTG	YES NO	1			
ATT	NO	ISOLEUCINE	2		
		1 POCEOCIAE	Z Z		
ATC ATA	YES YES	1			
ATG	NO	MEMERONIDATE			
		METHIONINE PERENYI AT ANDRE	01		
TTC	NO YES	PHENYLALANINE			
TGG		TOVERNOUS			
CCT	NO	TRYPTOPHAN	0		
	NO	PROLINE	2		
CCC	YES	4			
CCA	YES				
CCG	NO				
TCT	NO	SERINE	3	3 POLAR NONIONIZABLE (POL)	9
TCC TCA	YES				
TCG	YES NO				
AGT	NO				
AGC	YES				
TGT	NO	CYSTEINE	1		
TGC	YES				
AAT	NO	ASPARAGINE	1		
AAC	YES				
CAA	YES	GLUTAMINE	I		
CAG	NO				
TAT	NO	TYROSINE	1	7	
TAC	YES				
ACT	NO	THREONINE	2		
ACC	YES				
ACA	YES	4			
ACG	NO				
GAT	NO	ASPARTIC ACID	1	IONIZABLE: ACIDIC	2
GAC	YES			NEGATIVE CHARGE	
GAA	YES NO	GLUTAMIC ACID	1	(NEG)	
GAG					
AAA	YES	LYSINE	I	IONIZABLE: BASIC	5
AAG	NO	Ancomo	<u>-</u>	POSITIVE CHARGE (POS)	
CGC	NO YES	ARGININE	3	(r va)	
CGA	YES				
CGG	NO				
AGA	YES				
AGG	NO				
CAT	NO	HISTIDINE			
CAC	YES	10 Care Can 1 Can 1	^		
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TAG	_	ATOL CODOM	-	(STP)	6
	NO			(4.4.)	
TGA	YES				
64	32	18 Amino Ac	• •	NPL:POL:NEG:PO	20 000

TABLE 5. N,

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	2	NONPOLAR	14
GGC	NO			(NPL)	
GGA	YES				
GGG	NO		والمستوال المستوالية		
GCT	YES	ALANINE	2		
GCC	NO				
GCA	YES]			
GCG	NO				
GTT	YES	VALINE	2		
GTC	NO				
GTA _	YES				
GTG	NO				
TTA	YES	LEUCINE	3		
TTG	NO				
CTT	YES]			
CTC	NO				
CTA	YES	4	•		
CTG	NO		·		
ATT	YES	ISOLEUCINE	2		
ATC	МО				
ATA	YES				
ATG	NO	METHIONINE	0		
TIT	YES	PHENYLALANINE	1		
TTC	NO				
TGG	NO	TRYPTOPHAN	0		
CCT	YES	PROLINE	2		•
CCC	NO				
CCA	YES				
CCG	NO				
TCT	YES	SERINE	3	POLAR	9
TCC	NO			NONIONIZABLE	
TCA	YES			(POL)	
TCG	NO		\		
AGC	YES				
AGC TGT	NO	OT/OFFITE TO			
TGC	YES NO	CYSTEINE	1		
AAT	YES	ACDADACDIE	4		
AAC	NO	ASPARAGINE	. 1.		
CAA	YES	GLUTAMINE	**************************************		
CAG	NO	OLO TAMINE	•		
TAT	YES	TYROSINE	7		
TAC	NO	TIMOSHAD			
ACT	YES	THREONINE	2		
ACC	NO		~		
ACA'	YES				
ACG	NO				
GAT	YES	ASPARTIC ACID	1	IONIZABLE: ACIDIC	2
GAC	NO		-	NEGATIVE CHARGE	
GAA	YES	GLUTAMIC ACID	1	(NEG)	
GAG	NO				
AAA	YES	LYSINE	1	IONIZABLE: BASIC	5
AAG	NO		-	POSITIVE CHARGE	•
CGT	YES	ARGININE	3	(POS)	
CGC	NO				
CGA	YES				
CGG	NO				
AGA	YES		,		
AGG	NO				
CAT	YES	HISTIDINE	1		
CAC	NO				
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TAG	NO		l l	(STP)	
TGA	YES				
		10 A	- A	ATOT MOT ATTO	DOC. CITTO
64	32	18 Amino Ac Represent		NPL: POL: NEG: 14: 9: 2:	POS: STP : 5: 2

TOTAL Represented

TABLE 6. N, N, C/T

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	2.	NONPOLAR	14
GGC	YES			(NPL)	
GGA	NO				
GGG	NO	ALANINE	2		
GCT	YES YES	ALAMINE	2		
GCC	NO	-			
GCA GCG	NO	4			
GTT	YES	VALINE	2		
GTC	YES	AVERAG	2		
GTA	NO	1			
GTG	NO	1			
TTA	NO	LEUCINE	2		
TIG	NO		-		
CIT	YES				
CTC	YES				
CTA	NO				
CTG	NO				
ATT	YES	ISOLEUCINE	2		
ATC	YES				
ATA	NO				
ATG	NO	METHIONINE	0		
TIT	YES	PHENYLALANINE	2		
TTC	YES				
TGG	NO	TRYPTOPHAN	0		
CCT	YES	PROLINE	2		
CCC	YES	1			
CCA	NO	-			
CCG	NO				
TCT	YES	SERINE	4	POLAR	12
TCC TCA	YES NO	4		NONIONIZABLE (POL)	
TCG	NO			(102)	
AGT	YES	1			
AGC	YES				
TGT	YES	CYSTEINE	2		
TGC	YES				
AAT	YES	ASPARAGINE	2		
AAC	YES				
CAA	NO	GLUTAMINE	0		
CAG	NO				
TAT TAC	YES YES	TYROSINE	2		
ACT	YES	THEOROGINE	2		
ACC	YES	THREONINE	4		
ACA	NO	1			
ACG	NO				
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	2
GAC	YES			NEGATIVE CHARGE	
GAA	МО	GLUTAMIC ACID	0	(NEG)	
GAG	NO				المستان
AAA	NO	LYSINE	0	IONIZABLE: BASIC	4
AAG	NO			POSITIVE CHARGE	
CGT	YES	ARGININE	2	(POS)	
CGC	YES				
CGA CGG	NO NO	į			
AGA	NO				
AGG	NO	1			
CAT	YES	HISTIDINE	2		•
CAC	YES		-		
TAA	NO	STOP CODON	0	STOP SIGNAL	0
TAG	NO			(STP)	J
TGA				•	
	NO				
64	32	15 Amino Ac Represen		NPL:POL:NEG:P 14: 12: 2:	

TABLE 7. N, N, N

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ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	4	NONPOLAR	29
GGC	YES]		(NPL)	
GGA	YES	4			
GGG	YES	AY ADTIDITY			
GCT	YES	ALANINE	4		
GCC	YES				
GCA	YES	-{			
GCG	YES	TAX TO TO	4		
GTT	YES	VALINE	4		
GTC	YES	-			
GTA GTG	YES	-			
TTA	YES	LEUCINE	6		
TIG	YES	LECCHIC	J.		
CIT	YES	1			
CTC	YES				
CTA	YES		A		
CTG	YES				
ATT	YES	ISOLEUCINE	3		
ATC	YES				
ATA	YES				
ATG	YES	METHIONINE	1		
TIT	YES	PHENYLALANINE	2		
TTC	YES				
TGG	YES	TRYPTOPHAN	1		
CCT	YES	PROLINE	4		
CCC	YES	1			
CCA	YES	Ţ			
CCG	YES				
TCT	YES	SERINE	6	POLAR	18
TCC	YES		·	NONIONIZABLE	
TCA	YES]		(POL)	
TCG	YES				
AGT	YES		A		
AGC	YES				
TGT	YES	CYSTEINE	2		•
TGC	YES	400404000			
AAT AAC	YES YES	ASPARAGINE	2		
CAA	YES	GLUTAMINE	2		
CAG	YES	OLO I MILIUS	2		
TAT	YES	TYROSINE	2		
TAC	YES		-		
ACT	YES	THREONINE	4		
ACC	YES				
ACA	YES				
ACG	YES				
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES			NEGATIVE CHARGE	
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES				
AAA	YES	LYSINE	2	IONIZABLE: BASIC	10
AAG	YES			POSITIVE CHARGE	
CGT	YES	ARGININE	6	(POS)	
CGC	YES				
CGA	YES				
CGG	YES				
AGA AGG	YES YES		ì		
CAT		ENCTIONATE			
CAT	YES YES	HISTIDINE	2		
ن استفاد الم		OTOD CONO:-		AMAN AVALLE	
TAA	YES	STOP CODON	3	STOP SIGNAL	3
TAG	YES		I	(STP)	
TGA	YES				
		60 4		AMI DOL MEG.	
64	64	20 Amino Ac	INC ATA	NPL: POL: NEG: 1	

TABLE 8. N, N, G

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	NO	GLYCINE	1	NONPOLAR	8
GGC	NO	3		(NPL)	
GGA.	NO	_}			
GGG	YES	<u> </u>			
GCT	NO	ALANINE	1		
GCC	NO				
GCA	NO	7	A		
GCG	YES	7			
GTT	NO	VALINE	1		
GTC	NO	1	-		
GTA	NO	-[
GTG	YES	1			
	NO	LEUCINE	2		
TTA TTG	YES	LECCIVE	2		
crr	NO	-{			
CTC	NO	1			
CTA	NO	1			
CTG	YES	1			
ATT	NO	ISOLEUCINE	0		
ATC	NO	BORESCHAR	v		
		†	<u> </u>		
ATA	NO	Monanto man			
'ATG	YES	METHIONINE	<u> </u>		
TTT	NO	PHENYLALANINE	0		
TTC	NO				
TGG	YES	TRYPTOPHAN	1		
CCT	NO	PROLINE	1		
CCC	NO]			
CCA	NO				
CCG	YES	1	-		
TCT	NO	SERINE	1	POLAR	3
TCC	NO			NONIONIZABLE	•
TCA	NO	- †		(POL)	
TCG	YES	7		(2.00)	
AGT	NO	4			
AGC	NO				
TGT	NO	CYSTEINE	0		
TGC	NO	1 0101111111	· ·		
AAT	NO	ASPARAGINE	0		
AAC	NO	ABI IMMORID			
CAA	NO	GLUTAMINE	- 1		
CAG	YES	GLU:AMIND			
TAT	NO	TYROSINE	0		
TAC	NO	1 1 ROSMAE	v		
ACT	المستوال الم	THREONINE			
ACC	NO NO	INCOMINE	1		
ACA	NO	+			
ACG	YES	1			
		A COLA DIMICA A COLO		KUPLES V LALES V CALLAC	
GAT	NO	ASPARTIC ACID	0	IONIZABLE: ACIDIC NEGATIVE CHARGE	I
GAC	NO	CITITAL CO LOS		NEGATIVE CHARGE (NEG)	
GAA GAG	NO YES	GLUTAMIC ACID	7	(Luxu)	
AAA	NO	LYSINE	1	IONIZABLE: BASIC	3
AAG	YES			POSITIVE CHARGE	
CGT	NO	ARGININE	2	(POS)	
CGC	NO	4			
	NO	4			
CGA	YES	4	Į.		
CGG		1	1		
CGG AGA	NO	1			
CGG AGA AGG	YES				
CGG AGA AGG CAT	YES NO	HISTIDINE	0		
CGG AGA AGG CAT CAC	YES NO NO	HISTIDINE	0		
CGG AGA AGG CAT	YES NO	HISTIDINE STOP CODON	0	STOP SIGNAL	1
CGG AGA AGG CAT CAC TAA	YES NO NO NO			STOP SIGNAL (STP)	1
CGG AGA AGG CAT CAC TAA TAG	YES NO NO NO YES				1
CGG AGA AGG CAT CAC TAA	YES NO NO NO		1		1

TABLE 9. N, N, A

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequenc
GGT	NO	GLYCINE	1	NONPOLAR	7
GGC	NO		·	(NPL)	•
GGA	YES				
GGG	NO				
GCT	NO	ALANINE	1		
GCC	NO				
GCA	YES				
GCG	NO				
GIT	NO	VALINE	i		t
GTC	NO				
GTA	YES]			
GTG	NO		•		
TTA	YES	LEUCINE	2		
TTG	NO				
CTT	NO				
CTC	NO				
CTA	YES				
CIG	NO				
ATT	NO	ISOLEUCINE	1		
ATC	NO				
ATA	YES				
ATG	NO	METHIONINE	0		
TTT	NO	PHENYLALANINE	0		
TTC	NO				
TGG	NO	TRYPTOPHAN	0		
CCT	NO	PROLINE	1		
CCC	NO				
CCA	YES		<i></i>		
CCG	NO				
TCT	NO	SERINE	1	POLAR	3
TCC	NO			NONIONIZABLE	•
TCA	YES]		(POL)	
TCG	NO	}	· · · · · · · · · · · · · · · · · · ·		
AGT	NO		3		
AGC	NO				
TGT	NO	CYSTEINE	0		
TGC	NO				
TAA	NO	ASPARAGINE	0		
AAC	NO				
CAA CAG	YES NO	GLUTAMINE	1		
TAT	ويوسين بالربان المسانة كالسوارا	THE CONTRACT			
TAC	NO NO	TYROSINE	0		
ACT	NO	THREONINE			
ACC	NO	TYTICESCIALIAE	,		
ACA	YES		i		
ACG	NO				
GAT	NO	ASPARTIC ACID	O	IONIZABLE: ACIDIC	4
GAC	NO	(· ·	NEGATIVE CHARGE	Ţ
GAA	YES	GLUTAMIC ACID	1	(NEG)	
GAG	NO		•		
AAA	YES	LYSINE	Ī	IONIZABLE: BASIC	2
AAG	NO		^	POSITIVE CHARGE	3
CGT	NO	ARGININE	2	(POS)	
CGC	NO		-	•	
CGA	YES		1		
CGG	NO		i		
AGA	YES		•		
AGG	NO				
CAT	NO	HISTIDINE	0		
CAC	NO				
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TAG	NO		1	(STP)	
TCA	YES				
TGA					
64	16	12 Amino Aci		NPL:POL:NEG:PO	

TABLE 10. N, N, C

GGT					
	NO	GLYCINE	1	NONPOLAR	7
GGC	YES			(NPL)	
GGA	NO	4			
GGG	NO	44 12707			
GCT	NO	ALANINE	1		
GCC	YES	-			
GCA	NO	-		•	
GCG	NO	WAYDE			
GTT	NO	VALINE	1		
GTC	YES	-			
GTA GTG	NO NO	1			
TTA	NO	LEUCINE	1		
TIG	NO	LEUCINE			
CIT	NO				
CTC	YES	1			
CTA	NO				
CIG	NO				
ATT	NO	ISOLEUCINE	1		
ATC	YES				
ATA	NO				
ATG	NO	METHIONINE	0		
TIT	NO	PHENYLALANINE	1		
TIC	YES				
TGG	NO	TRYPTOPHAN	0		
CCT	NO	PROLINE	1		
CCC	YES	1			
CCA	NO	·			
CCG	NO				
TCT	NO	SERINE	2 POLAR	POLAR	6
TCC	YES		:	NONIONIZABLE	
TCA	NO		i	(POL)	
TCG	NO				
AGT AGC	NO YES				
TGT	NO	CYSTEINE	 [
TGC	YES	Cigitales	, 1		
AAT	NO	ASPARAGINE			
AAC	YES				
CAA	NO	GLUTAMINE	0		
CAG	NO				
TAT	NO	TYROSINE	1		
TAC	YES	والمرواد والمارية			
ACT	NO	THREONINE	1		
ACC	YES		ł		
ACA ACG	NO NO				
GAT	NO	ASPARTIC ACID	1	IONIZABLE: ACIDIC	1
GAA	YES	CT TEPATOR A COM-		NEGATIVE CHARGE	
GAA GAG	NO NO	GLUTAMIC ACID	0	(NEG)	
	NO	* 1/05 P			
AAA AAG	NO	LYSINE	0	IONIZABLE: BASIC	2
CGT	NO	ADCDING		POSITIVE CHARGE (POS)	
CGC	NO YES	ARGININE	1	(ros)	
CGA	NO				•
CGG	NO		į.		
AGA	NO				
AGG	NO			•	
CAT	NO	HISTIDINE	1		
CAC	YES				
TAA	NO	STOP CODON	0	STOP SIGNAL	0
TAG	NO			(STP)	
	NO				
TGA					

TOTAL '

TABLE 11. N, N, T

DOON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequenc
GGT	YES	GLYCINE	1	NONPOLAR	7
GGC	NO			(NPL)	
GGA	NO				
GGG	NO				
GCT	YES	ALANINE	1		
GCC	NO	4			
GCA	NO	4			
GCG	NO				
GTT	YES	VALINE	1		
GTC	NO	4			
GTA	NO	-	N.		
GTG	NO	7 100 100			
TTA TTG	NO NO	LEUCINE	1		
CTT	YES	4			
CTC	NO	1			
CTA	NO	1			
CTG	NO				
ATT	YES	ISOLEUCINE	1		
ATC	NO				
ATA	NO				
ATG	NO	METHIONINE	0		
TTT	YES	PHENYLALANINE	1		
TTC	NO				
TGG	NO	TRYPTOPHAN	0		
CCT	YES	PROLINE	I		
CCC	NO				
CCA	NO]		·	
CCG	NO	1			
TCT	YES	SERINE	2	POLAR	6
TCC	NO		_	NONIONIZABLE	_
TCA	NO]		(POL)	
TCG	NO				
AGT	YES				
AGC	NO				
TGT	YES	CYSTEINE	1		
TGC AAT	NO	ASPADASPIE			
AAC	YES NO	ASPARAGINE	1.		
CAA	NO	GLUTAMINE	0		
CAG	NO		, i		
TAT	YES	TYROSINE	1		
TAC	NO		"		
ACT	YES	THREONINE	1		
ACC	NO				
ACA	NO	4 .			
ACG	NO	<u>'</u>			
GAT	YES	ASPARTIC ACID	1	IONIZABLE: ACIDIC	1
GAC	NO			NEGATIVE CHARGE	
GAA	NO	GLUTAMIC ACID	0	(NEG)	
GAG	NO				
AAA	NO	LYSINE	0	IONIZABLE: BASIC	2
AAG	NO			POSITIVE CHARGE	
CGT	YES	ARGININE	1	(POS)	
CGC CGA	NO	4			
CGG	NO NO	4	•		
AGA	NO	1	I		
AGG	NO	4			
CAT	YES	HISTIDINE	1		
CAC	NO		•		
TAA	NO	STOP CODON	0	STOP SIGNAL	0
TAG	NO	3 TOL CODON	· ·	STOP SIGNAL (STP)	U
LAN		4	Į	\ - - /	
			E		
TGA	NO 16				

TABLE 12. N, N, C/G/T

DDON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	3	NONPOLAR	22
GGC	YES	4		(NPL)	
GGA	NO	-			
GGG	YES				
GCT	YES	ALANINE	3		
GCC	YES	_}			
GCA	NO				
GCG	YES				
GTT	YES	VALINE	3		
GTC	YES	1			
GTA	NO	7	A1		
GTG	YES	1			
TTA	NO	LEUCINE	· 4		
TIG	YES		•		
CTT	YES	1			
CTC	YES	1			
CTA	NO				
CTG	YES				
ATT	YES	ISOLEUCINE	2		
ATC	YES				
ATA	NO	1			
ATG	YES	METHIONINE	1		
TIT	YES	PHENYLALANINE	2		
TTC	YES	A SECTION ASSESSMENT AND	4		
TGG		TIPS AND THE A ST			
CCT	YES	TRYPTOPHAN	1		
	YES	PROLINE	3		
CCC	YES	4	1		
CCA	NO	Į			
CCG	YES				
TCT	YES	SERINE	. 5	POLAR	15
TCC	YES			NONIONIZABLE	
TCA	NO			(POL)	
TCG	YES				
AGT	YES		4		
AGC	YES				
TGT	YES	CYSTEINE	2		
TGC	YES				
AAT	YES	ASPARAGINE	2		
AAC	YES	•			
CAA	NO	GLUTAMINE	1		
CAG	YES				
TAT	YES	TYROSINE	2		
TAC	YES				
ACT	YES	THREONINE	3		
ACC	YES				
ACA	NO		4		
ACG	YES				
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	3
GAC	YES			NEGATIVE CHARGE	•
GAA	NO	GLUTAMIC ACID	1	(NEG)	
GAG	YES				
AAA	NO	LYSINE	7	IONIZABLE: BASIC	7
AAG	YES			POSITIVE CHARGE	•
CGT	YES	ARGININE	4	(POS)	
CGC	YES		"	4 /	
CGA	NO		. [
CGG	YES				
AĞA	NO				
AGG	YES		ſ		
CAT	YES	HISTIDINE	2		
CAC	YES		-		
أخزا برسنتان	الكالم المستحدد	CTOR COM			
TAA	NO	STOP CODON	1	STOP SIGNAL	1
TAG	YES		i	(STP)	
ma a l'	NO				
IGA					
TGA 64	48	20 Amino Aci	1-1	NPL:POL:NEG:PO	74 ann

TABLE 13

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
GGT	YES	GLYCINE	3	NONPOLAR	22
GGC	NO			(NPL)	
GGA	YES				
GGG GCT	YES YES	ALANINE	3		
GCC	NO	ALAMINE	,		
GCA	YES				
GCG	YES				
GTT	YES	VALINE	3		
GTC	NO				
GTA	YES				
GTG	YES				
TTA	YES	LEUCINE	5		
TTG	YES	1			
CTC	YES NO	4			
CTC CTA	YES	1			
CIG	YES				
ATT	YES	ISOLEUCINE	2		
ATC	NO				•
ATA	YES				
ATG	YES	METHIONINE	1		
TTT	YES	PHENYLALANINE	1		
TTC	NO				
TGG	YES	TRYPTOPHAN	1		
CCC	YES NO	PROLINE	3		
CCA	YES	-			
CCG	YES	-			
TCT	YES	SERINE	4	POLAR	12
TCC	NO	SPRING	*	NONIONIZABLE	1.20
TCA	YES			(POL)	
TCG	YES				
AGT	YES		•		
AGC	NO	63.50 mm 2 mm			
TGT	YES NO	CYSTEINE			
AAT	YES	ASPARAGINE	1		
AAC	NO	, mindignin			
CAA	YES	GLUTAMINE	2		
CAG	YES				
TAT	YES	TYROSINE	1		
TAC	NO				
ACT ACC	YES NO	THREONINE	3		
ACA	YES				
ACG	YES				
GAT	YES	ASPARTIC ACID	1	IONIZABLE: ACIDIC	3
GAC	NO			NEGATIVE CHARGE	-
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES				
AAA	YES	LYSINE	2	IONIZABLE: BASIC	8
AAG	YES	Aponom		POSITIVE CHARGE (POS)	
CGC	YES	ARGININE	5	(100)	
CGA	YES	†			
CGG	YES]			
AGA	YES				
AGG	YES				
CAT	YES	HISTIDINE	1		
CAC	NO	- COMPANIES - COMP			
TAA	YES	STOP CODON	3	STOP SIGNAL	3
TAG	YES	4		(STP)	
	YES	1		_	
TGA					

PCT/US02/15767 WO 02/092780

TABLE 14. N, N, A/C/T

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	3	NONPOLAR	21
GGC	YES			(NPL)	
GGA	YES				
GGG	NO				
GCT	YES	ALANINE	3		
GCC	YES	-			
GCA	YES				
GCG	NO				
GTT	YES	VALINE	3		
GTC	YES				
GTA	YES				
GTG	NO				
TTA	YES	LEUCINE	. 4		
TIG	NO	-{			
CTC	YES YES	-			
CTA	YES	,			
CIG	NO				
ATT	YES	ISOLEUCINE	3		
ATC	YES	1 DODECOND			
ATA	YES	1			
ATG	NO	METHIONINE	0		
TIT	YES	PHENYLALANINE	2		
TTC	YES	- COMPANY TRANSMISSION	26		
TGG	NO	TRYPTOPHAN	0		
CCT	YES	PROLINE	3		
CCC	YES	TROINE	3		
CCA	YES	-			
CCG	NO	1			
		OFFINALE	F	TOT AD	16
TCT TCC	YES YES	SERINE 5	POLAR NONIONIZABLE	15	
TCA	YES			(POL)	
TCG	NO		<u> </u>	(202)	
AGT	YES		1		
AGC	YES				
TGT	YES	CYSTEINE	2		
TGC	YES				
AAT	YES	ASPARAGINE	2		
AAC	YES				
CAA	YES	GLUTAMINE	1		
CAG	NO				
TAT	YES	TYROSINE	2		
TAC	YES	TIMEONT			
ACT ACC	YES YES	THREONINE	3		
ACA	YES	1	1		
ACG	NO	1	i		
GAT	YES	·ASPARTIC ACID		IONITA DI 12. ACIDICI	2
GAC	YES	MOFARTIC ACID	2	IONIZABLE: ACIDIC NEGATIVE CHARGE	3
GAA	YES	GLUTAMIC ACID	1	(NEG)	
GAG	NO		*		
AAA	YES	LYSINE	1	IONIZABLE: BASIC	7
AAG	NO	LIGHT	1	POSITIVE CHARGE	,
CGT	YES	ARGININE	4	(POS)	•
CGC	YES		· •	· · · ·	
CGA	YES]	Į.		
CGG	NO		1		
AGA	YES				
AGG	NO]		
CAT	YES	HISTIDINE	2		
CAC	YES				
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TAG	NO		1	(STP)	
TGA	YES				
		10 4			76 65°
64	48	18 Amino Aci Represent		NPL:POL:NEG:PO	OS:STP = 7: 2

TOTAL

TABLE 15. N, N, A/C/G

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	NO	GLYCINB	3	NONPOLAR	22
GGC	YES	4		(NPL)	
GGA	YES				
GGG	YES	ALANINE	2		
GCT	NO	- ALANINE	3		
GCC	YES	-			
GCA	YES	1			
GCG	YES		<u></u>		
GTT	NO	VALINE	3		
GTC	YES				
GTA	YES		•		
GTG	YES				
TTA	YES	LEUCINE	5		
TTG	YES				
CTC	NO YES				
CTA	YES	4			
CTG	YES				
ATT	NO	ISOLEUCINE	2		
ATC	YES		~		
ATA	YES	1		,	
ATG	YES	METHIONINE	1		
TTT	NO	PHENYLALANINE	1		
TTC	YES	T THE TENTAL PROPERTY OF THE PERTY OF THE PE	-		
TGG	YES	TRYPTOPHAN	1		
CCT	NO	PROLINE	3		
CCC	YES				
CCA	YES	1			
CCG	YES	†			
		- Cutton and 500			
TCC	NO YES	SERINE	4	POLAR NONTONIZARI E	12
TCA	YES			NONIONIZABLE (POL)	
TCG	YES	1		(100)	
AGT	NO	1			
AGC	YES				
TGT	NO	CYSTEINE	1		
TGC	YES				
AAT	NO	ASPARAGINE	1		
AAC	YES				
CAA	YES	GLUTAMINE	2		
CAG	YES				
TAT	NO	TYROSINE	1		
TAC	YES				
ACC	NO	THREONINE	3		
ACC ACA	YES YES	1			
ACG	YES	1			
		ASDADITO ASS	[KAL provide the second	
GAT GAC	NO YES	ASPARTIC ACID	1	IONIZABLE: ACIDIC	, 3
GAA		GLUTAMIC ACID		NEGATIVE CHARGE (NEG)	
GAG	YES YES	APOTAMIC ACID	2	(LALAS)	
		1 1000 TT			
AAA AAG	YES	LYSINE	. 2	IONIZABLE: BASIC	8
CGT	YES	Anchire		POSITIVE CHARGE (POS)	
CGC	NO YES	ARGININE	5	(LON)	
CGA	YES		1		
CGG	YES	1			
AGA	YES	1	i		
AGG	YES	1	ì		
CAT	NO	HISTIDINE	1		
CAC	YES				
TAA	YES	STOP CODON	3	STOP SIGNAL	3
TAG	YES			(STP)	•
		1	4	V	
TGA	YES				
64	48	20 Amino Ac Represen		NPL:POL:NEG:P 22: 12: 3:	

TABLE 16. N, A, A

(Frequenc	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON
0	NONPOLAR	0	GLYCINE		
	(NPL)	0	ALANINE		
		0	VALINE		
		0	LEUCINE		
		0	ISOLEUCINE		
		0	METHIONINE		
		Ö	PHENYLALANINE		
		0	TRYPTOPHAN		
		0	PROLINE		
1	POLAR	0	SERINE		
	NONIONEZABLE	0	CYSTEINE		
	(POL)	0	ASPARAGINE		
		1	GLUTAMINE	YES	CAA
		0	TYROSINE		
		0	THREONINE		
1	IONIZABLE: ACIDIC	0	ASPARTIC ACID		
	NEGATIVE CHARGE (NEG)	1	GLUTAMIC ACID	YES	GÀA
1	IONIZABLE: BASIC	1	LYSINE	YES	AAA
_	POSITIVE CHARGE	0	ARGININE		
	(POS)	0	HISTIDINE		
1	STOP SIGNAL (STP)	1	STOP CODON	YES	TAA
POS:STP =	NPL:POL:NEG:P	ds Are	3 Amino Aci	4	
1: 1		ted	Represen		

TOTAL

5

TABLE 17. N, A, C

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	D
		ALANINE	0	(NPL)	
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	2
		CYSTEINE	0	NONIONIZABLE	_
AAC	YES	ASPARAGINE	Ī	(POL)	
		GLUTAMINE	0		
TAC	YES	TYROSINE	1		
		THREONINE	0	·	
GAC	YES	ASPARTIC ACID	1	IONIZABLE: ACIDIC	1
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	•
		LYSINE	0	IONIZABLE: BASIC	1
		ARGININE	0	POSITIVE CHARGE	•
CAC	YES	HISTIDINE	1	(POS)	
		STOP CODON	0	STOP SIGNAL (STP)	0
	4	4 Amino Aci Represen		NPL:POL:NEG:P 0: 2: 1:	OS:STP =

TOTAL

TABLE 18. N, A, G

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	0
		ALANINE	0	(NPL)	
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	1
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0 ,	(POL)	
CAG	YES	GLUTAMINE	1		
		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	1
GAG	YES	GLUTAMIC ACID	1	NEGATIVE CHARGE (NEG)	
AAG	YES	LYSINE	1	IONIZABLE: BASIC	1
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
TAG	YES	STOP CODON	1	STOP SIGNAL (STP)	1
	4	3 Amino Aci Represen		NPL:POL:NEG:P 0: 1: 1:	OS:STP = 1: 1

5

TABLE 19. N, A, T

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	YCINE 0	NONPOLAR	O
		ALANINE	0	(NPL)	
•		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		and the same of th
		SERINE	0	POLAR	2
		CYSTEINE	0	NONIONIZABLE	
AAT	YES	ASPARAGINE	1	(POL)	
		GLUTAMINE	0		
TAT	YES	TYROSINE	1		
		THREONINE	0		
GAT	YES	ASPARTIC ACID	1	IONIZABLE: ACIDIC	1
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	1
		ARGININE	0	POSITIVE CHARGE	
CAT	YES	HISTIDINE	1	(POS)	
		STOP CODON	0	STOP SIGNAL (STP)	0
	4	4 Amino Ac	ids Are	NPL:POL:NEG:P	OS:STP =
	Represen	ted	0: 2: 1:	1: 0	

TOTAL

TABLE 20. N, C, A

	CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
			GLYCINB	0	NONPOLAR	2
	GCA	YES	ALANINE	1	(NPL)	
	V = =====		VALINE	0		
			LEUCINE	0		
			ISOLEUCINE	0		
			METHIONINE	0		
			PHENYLALANINE	0		
			TRYPTOPHAN	0		
	CCA	YES	PROLINE	1		
	TCA	YES	SERINE	1	POLAR	2
			CYSTEINE	0	NONIONIZABLE	
			ASPARAGINE	0	(POL)	
			GLUTAMINE	0		
			TYROSINE	0		
	ACA	YES	THREONINE	1		
			ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
			GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
			LYSINE	0	IONIZABLE: BASIC	0
			ARGININE	0	POSITIVE CHARGE	
			HISTIDINE	0	(POS)	
			STOP CODON	0	STOP SIGNAL (STP)	0
TOTAL		4	4 Amino Ac	ids Are	NPL:POL:NEG:H	POS:STP =
		·	Represer		2: 2: 0:	0: 0

TABLE 21. N, C, C

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	2
GCC YES	ALANINE		(NPL)		
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCC	YES	PROLINE	1		
TCC	YES	SERINE	1	POLAR	2
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
		GLUTAMINE	0		
		TYROSINE	0		
ACC	YES	THREONINE	1		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	Q
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	0
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
		STOP CODON	0	STOP SIGNAL (STP)	0
4		4 Amino Aci Represen		NPL:POL:NEG:P 2: 2: 0:	OS:STP = 0: 0

TOTAL

TABLE 22. N, C, G

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	2
GCG	YES	ALANINE		(NPL)	
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	Q		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCG	YES	PROLINE	1		
TCG	YES	SERINE	1	POLAR	2
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
		GLUTAMINE	0		
		TYROSINE	0		
ACG	YES	THREONINE	1		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	0
		ARGININE	Q	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
		STOP CODON	0	STOP SIGNAL (STP)	0
	4	4 Amino Ac	ids Are	NPL:POL:NEG:P	
		Represer	nted	2: 2: 0:	0: 0

TABLE 23. N, C, T

TOTAL

DDON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
		GLYCINE	0	NONPOLAR	2
GCT	YES	ALANINE	1	(NPL)	
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCT	YES	PROLINE	1		
TCT	YES	SERINE	1	POLAR	2
		CYSTEINE	0	NONIONIZABLE (POL)	
		ASPARAGINE	0		
		GLUTAMINE	0	•	
		TYROSINE	0		
ACT	YES	THREONINE	1		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	0
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
		STOP CODON	0	STOP SIGNAL (STP)	0
	4	4 Amino Ac	ids Are	NPL:POL:NEG:F	OS:STP =
		Represer	nted I	2: 2: 0:	0: 0

TABLE 24. N, G, A

(Frequency	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON
1	NONPOLAR	1 - 1	GLYCINE	YES	GGA
	(NPL)	0	ALANINE		
		0	VALINE		
		0	LEUCINE		البهارين بينانات
		0	ISOLEUCINE		المنصوب والفرار فعادات
		0	METHIONINE		
		0	PHENYLALANINE		
		0	TRYPTOPHAN		
		0	PROLINE		
0	POLAR	0	SERINE		
	NONIONIZABLE	0	CYSTEINE		
	(POL)	0	ASPARAGINE		
		0	GLUTAMINE		
		0	TYROSINE		
		0	THREONINE		
0	IONIZABLE: ACIDIC	0	ASPARTIC ACID		
	NEGATIVE CHARGE (NEG)	0	GLUTAMIC ACID		
2	IONIZABLE: BASIC	0	LYSINE		
	POSITIVE CHARGE	2	ARGININE	YES	CGA
	(POS)			YES	AGA
		0	HISTIDINE		
1	STOP SIGNAL (STP)	1	STOP CODON	YES	TGA
POS:STP =	NPL:POL:NEG:	ds Are	2 Amino Ac	4	
2: 1	1: 0: 0:	ted	Represer		

TABLE 25. N, G, C

(Frequen	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON	
1	NONPOLAR	1	GLYCINE	YES	GGC	
	(NPL)	0	ALANINE			
		0	VALINE			
		0	LEUCINE			
		0	ISOLEUCINE			
		0	METHIONINE			
		0	PHENYLALANINE			
		0	TRYPTOPHAN			
The state of		0	PROLINE			
2	POLAR NONIONIZABLE (POL)	1	SERINE	YES	AGC	
		1	CYSTEINE	YES	TGC	
		0	ASPARAGINE			
		0	GLUTAMINE			
		0	TYROSINE			
		0	THREONINE			
0	IONIZABLE: ACIDIC	0	ASPARTIC ACID			
	NEGATIVE CHARGE (NEG)	.0	GLUTAMIC ACID			
1	IONIZABLE: BASIC	0	LYSINE			
	POSITIVE CHARGE	1	ARGININE	YES	CGC	
	(POS)	0	HISTIDINE			
0	STOP SIGNAL (STP)	0	STOP CODON			
	NPL:POL:NEG:I	ids Are	4 Amino Ac	4		
1: 0	1: 2: 0:	ited	Represen			

TABLE 26. N, G, G

(Frequenc	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON
2	NONPOLAR		GLYCINE	YES	GGG
	(NPL)	0	ALANINE		
		0	VALINE		
		0	LEUCINE		
		0	ISOLEUCINE		
		0	METHIONINE		
		0	PHENYLALANINE		
		1	TRYPTOPHAN	YES	TGG
		0	PROLINE		
0	POLAR	0	SERINE		
	NONIONIZABLE (POL)	0	CYSTEINE		
		0	ASPARAGINE		
		0	GLUTAMINE		
		0	TYROSINE		
		0	THREONINE		
0	IONIZABLE: ACIDIC	0	ASPARTIC ACID		_
	NEGATIVE CHARGE (NEG)	0	GLUTAMIC ACID		
2	IONIZABLE: BASIC	0	LYSINE		
	POSITIVE CHARGE	2	ARGININE	YES	CGG
	(POS)			YES	AGG
		0	HISTIDINE		
0	STOP SIGNAL (STP)	0	STOP CODON		
POS:STP =	NPL:POL:NEG:I	ids Are	3 Amino Ac	4	
2: 0	2: 0: 0:	ted	Represen		

TABLE 27. N, G, T

Frequenc	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON
1	NONPOLAR	1	GLYCINE	YES	GGT
	(NPL)	0	ALANINE		
		0	VALINE		
		0	LEUCINE		
		0	ISOLEUCINE		
		0	METHIONINE		
		0	PHENYLALANINE		
		0	TRYPTOPHAN		
		0	PROLINE		
2	POLAR NONIONIZABLE (POL)		SERINE	YES	AGT
		1	CYSTEINE	YES	TGT
		0	ASPARAGINE		
		0	GLUTAMINE		
		0	TYROSINE		
_		0	THREONINE		
0	IONIZABLE: ACIDIC	0	ASPARTIC ACID		
	NEGATIVE CHARGE (NEG)	0	GLUTAMIC ACID		
1	IONIZABLE: BASIC	0	LYSINE		
	POSITIVE CHARGE	1	ARGININE	YES	CGT
	(POS)	0	HISTIDINE		
0	STOP SIGNAL (STP)	0	STOP CODON		
POS:STP =	NPL:POL:NEG:I	ids Are	4 Amino Ac	4	
1: 0	1: 2: 0:	ted	Represen		

T

TABLE 28. N, T, A

(Frequenc	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON
4	NONPOLAR	0	GLYCINE		
	(NPL)	0	ALANINE		
		1	VALINE	YES	GTA
		2	LEUCINE	YES	TTA
				YES	CTA
		1	ISOLEUCINE	YES	ATA
		0	METHIONINE		
		0	PHENYLALANINE		
		0	TRYPTOPHAN		
		0	PROLINE		
0	POLAR	0	SERINE		
	NONIONIZABLE (POL)	0	CYSTEINE		
		0	ASPARAGINE		
		0	GLUTAMINE		
		0	TYROSINE		
		0	THREONINE		
0	IONIZABLE: ACIDIC	0	ASPARTIC ACID		
	NEGATIVE CHARGE (NEG)	0	GLUTAMIC ACID		
Ū.	IONIZABLE: BASIC	0	LYSINE		
	POSITIVE CHARGE	0	ARGININE		
	(POS)	0	HISTIDINE		
0	STOP SIGNAL (STP)	0	STOP CODON		
:POS:STP =	NPL:POL:NEG:	ds Are	3 Amino Ac	4	
0: 0	4: 0: 0:	ted	Represen		

TABLE 29. N, T, C

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
		GLYCINE	0	NONPOLAR	4
		ALANINE	0	(NPL)	
GTC	YES	VALINE	1		
CTC	YES	LEUCINE	1		
ATC	YES	ISOLEUCINE	1		
		METHIONINE	0		
TTC	YES	PHENYLALANINE	1		
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	0
		CYSTEINE	0	NONIONIZABLE (POL)	
<u> </u>		ASPARAGINE	0		
		GLUTAMINE	0		
		TYROSINE	0	•	
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	0
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
		STOP CODON	0	STOP SIGNAL (STP)	0
	4	4 Amino Acids Are Represented		NPL:POL:NEG:P 4: 0: 0:	OS:STP = 0: 0

TABLE 30. N, T, G

(Frequency	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON
4	NONPOLAR	0	GLYCINE		
	(NPL)	0	ALANINE		
		1	VALINE	YES	GTG
		2	LEUCINE	YES	TTG
				YES	CTG
		0	ISOLEUCINE		
		1	METHIONINE	YES	ATG
		0	PHENYLALANINE		
		0	TRYPTOPHAN		
		0	PROLINE		
C	POLAR	0	SERINE		
	NONIONIZABLE	0	CYSTEINE		
	(POL)	0	ASPARAGINE		
		0	GLUTAMINE		
		0	TYROSINE		
		0	THREONINE		
0	IONIZABLE: ACIDIC	0	ASPARTIC ACID		
	NEGATIVE CHARGE (NEG)	0	GLUTAMIC ACID		
0	IONIZABLE: BASIC	0	LYSINE		
	POSITIVE CHARGE	0	ARGININE		
	(POS)	0	HISTIDINE		
0	STOP SIGNAL (STP)	0	STOP CODON		
POS:STP =	NPL:POL:NEG:P	ids Are	3 Amino Aci	4	
0: 0	4: 0: 0:	ted	Represented		

5

TOTAL

TABLE 31. N, T, T

(Frequen	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON
4	NONPOLAR	0	GLYCINE		
	(NPL)	0	ALANINE		
			VALINE	YES	GTT
		1	LEUCINE	YES	CTT
		1	ISOLEUCINE	YES	ATT
		0	METHIONINE		
		1	PHENYLALANINE	YES	TTT
		0	TRYPTOPHAN		
		0	PROLINE		
0	POLAR	0	SERINE		
	NONIONIZABLE	0	CYSTEINE		
	(POL)	0	ASPARAGINE		
		0	GLUTAMINE		
		0	TYROSINE		
		0	THREONINE		
Ö	IONIZABLE: ACIDIC	0	ASPARTIC ACID		
	NEGATIVE CHARGE (NEG)	0	GLUTAMIC ACID		
Ö	IONIZABLE: BASIC	0	LYSINE		
	POSITIVE CHARGE	0	ARGININE		
	(POS)	3	HISTIDINE		
0	STOP SIGNAL (STP)	0	STOP CODON		
:POS:STP =	NPL:POL:NEG:P	ds Are	4 Amino Aci	4	
0: 0	4: 0: 0:	ted	Represented		

TABLE 32. N, A/C, A

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
الدباط الشبارين السب		GLYCINE	. 0	NONPOLAR	2
GCA	YES	ALANINE	1	(NPL)	
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCA	YES	PROLINE	1		
TCA	YES	SERINE	1	POLAR	3
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
CAA	YES	GLUTAMINE	1		
		TYROSINE	0		
ACA	YES	THREONINE	1		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	1
GAA	YES	GLUTAMIC ACID	1	NEGATIVE CHARGE (NEG)	
AAA	YES	LYSINE	1	IONIZABLE: BASIC	1
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
TAA	YES	STOP CODON	1	STOP SIGNAL (STP)	1
	8	7 Amino Ac	ids Are	NPL:POL:NEG:F	OS:STP =
		Represer	nted	2: 3: 1:	1: 1

TOTAL

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
GGA	YES	GLYCINE	1	NONPOLAR	1
		ALANINE	0	(NPL)	
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	1
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
CAA	YES	GLUTAMINE	1		
		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	. 0	IONIZABLE: ACIDIC	1
GAA	YES	GLUTAMIC ACID	1	NEGATIVE CHARGE (NEG)	
AAA	YES	LYSINE	1	IONIZABLE: BASIC	3
CGA	YES	ARGININE	2	POSITIVE CHARGE	
AGA	YES			(POS)	
		HISTIDINE	0	2000	
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TGA	YES			(STP)	
	8	5 Amino Ac Represer		NPL:POL:NEG:I 1: 1: 1:	

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TABLE 34. N	I. A/T. A	1
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CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	. 0	NONPOLAR	4
		ALANINE	0	(NPL)	
GTA	YES	VALINE	1		
TTA	YES	LEUCINE	2		
CTA	YES				
ATA	YES	ISOLEUCINE	1		
		METHIONINE	- 0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	1
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
CAA	YES	GLUTAMINE	1		
فالتكار والمتاب والمتابي والمتاب والمتاب		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	i
GAA	YES	GLUTAMIC ACID	1	NEGATIVE CHARGE (NEG)	
AAA	YES	LYSINE	1	IONIZABLE: BASIC	1
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
TAA	YES	STOP CODON	1	STOP SIGNAL (STP)	1
	8	6 Amino Ac Represer	10	NPL:POL:NEG:P	POS:STP = 1: 1

TABLE 35. N, C/G, A

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
GGA	YES	GLYCINE	1	NONPOLAR	3
GCA	YES	ALANINE	1	(NPL)	
		VALINE	0		
		LEUCINE	. 0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCA	YES	PROLINE	1		
TCA	YES	SERINE	1	POLAR	2
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
		GLUTAMINE	0		
		TYROSINE	0		
ACA	YES	THREONINE	1		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	2
CGA	YES	ARGININE	2	POSITIVE CHARGE	
AGA	YES			(POS)	
		HISTIDINE	0		
TGA	YES	STOP CODON	1	STOP SIGNAL (STP)	1
	8	6 Amino Ac	ids Are	NPL:POL:NEG:P	OS:STP =
		Represer	ited	3: 2: 0:	2: 1

TA	1R	F	36	N	C/T.	Δ
_ X_	JJ.	ناب	JU.	T.Y.	WI.	$\boldsymbol{\Box}$

(Frequency	CATEGORY	(Frequency)	AMINO ACID	Represented	CODON
6	NONPOLAR	0	GLYCINE		
	(NPL)	1	ALANINE	YES	GCA
		1	VALINE	YES	GTA
		2	LEUCINE	YES	TTA
				YES	CTA
		1	ISOLEUCINE	YES	ATA
		0	METHIONINE		
		0	PHENYLALANINE		
		0	TRYPTOPHAN		
	-Ciria -		PROLINE	YES	CCA
2	POLAR	1	SERINE	YES	TCA
	NONIONIZABLE	0	CYSTEINE		
	(POL)	0	ASPARAGINE		
		0	GLUTAMINE		
		0	TYROSINE		
		1	THREONINE	YES	ACA
0	IONIZABLE: ACIDIC	0	ASPARTIC ACID		
	NEGATIVE CHARGE (NEG)	0	GLUTAMIC ACID		
0	IONIZABLE: BASIC	0	LYSINE		
	POSITIVE CHARGE	0	ARGININE		
	(POS)	0	HISTIDINE		
0	STOP SIGNAL (STP)	0	STOP CODON		
POS:STP =	NPL:POL:NEG:F	ds Are	7 Amino Aci	8	
0: 0			Represen		

TABLE 37

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
GGA	YES	GLYCINE		NONPOLAR	5
		ALANINE	0	(NPL)	
GTA	YES	VALINE	1		
TTA	YES	LEUCINE	2		
CTA	YES				
ATA	YES	ISOLEUCINE	1		
		METHIONINE	0		
		PHENYLALANINE	0		
v		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	0
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
		GLUTAMINE	0		
		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	Ō
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	2
CGA	YES	ARGININE	2	POSITIVE CHARGE	
AGA	YES			(POS)	
		HISTIDINE	0		
TGA	YES	STOP CODON	1	STOP SIGNAL (STP)	1
	8	5 Amino Aci	ids Are	NPL:POL:NEG:P	OS:STP =
		Represen			2: 1

TOTAL

TA	RI	F	38	N	C/G/T.	A
	L I D S.	<i>-</i> 1	~/ 13 a	7.7		

	3. N, C/G/T,	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
	GGA	YES	GLYCINE	1,	NONPOLAR	7
	GCA	YES	ALANINE	1	(NPL)	
	GTA	YES	VALINE	1		
	TTA	YES	LEUCINE	2		
	CTA	YES		·		
	ATA	YES	ISOLEUCINE	1		
			METHIONINE	0		
			PHENYLALANINE	0		
			TRYPTOPHAN	0		
	CCA	YES	PROLINE	1		
	TCA	YES	SERINE	1	POLAR	2
			CYSTEINE	0	NONIONIZABLE	
			ASPARAGINE	0	(POL)	
			GLUTAMINE	0		
		·	TYROSINE	0		
	ACA	YES	THREONINE	1		
			ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
			GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
			LYSINE	0	IONIZABLE: BASIC	2
	CGA	YES	ARGININE	2	POSITIVE CHARGE	
	AGA	YES			(POS)	
			HISTIDINE	0		
	TGA	YES	STOP CODON	1	STOP SIGNAL (STP)	
TOTAL		12	9 Amino Ac Represe		NPL:POL:NEG:F 7: 2: 0:	POS:STP = 2: 1

5
TABLE 39. N, A/G/T, A

TOTAL

DDON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
GGA	YES	GLYCINE	1	NONPOLAR	5
المعيدوهم عالانات تعربونها		ALANINE	0	(NPL)	
GTA	YES	VALINE			
TTA	YES	LEUCINE	2		
CTA	YES				
ATA	YES	ISOLEUCINE			
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
CAA	YES	GLUTAMINE	1		
		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	. 0	IONIZABLE: ACIDIC	1
GAA	YES	GLUTAMIC ACID	1	NEGATIVE CHARGE (NEG)	
AAA	YES	LYSINE	<u> </u>	IONIZABLE: BASIC	3
CGA	YES	ARGININE	2	POSITIVE CHARGE	
AGA	YES			(POS)	
		HISTIDINE	0		<u> </u>
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TGA	YES			(STP)	
	12	8 Amino Ac	ids Are	NPL:POL:NEG:P	OS:STP =
		Represe	-4-4	5: 1: 1:	0. 0

TA	RT	F	40	N	ΔI	C/T.	A
1.2	3 173 1	-17	H .	. I N .	\boldsymbol{D}		$\boldsymbol{\mathcal{L}}$

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	6
GCA	YES	ALANINE	1	(NPL)	
GTA	YES	VALINE	1		
TTA	YES	LEUCINE	2		
CTA	YES				
ATA	YES	ISOLEUCINE	1		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCA	YES	PROLINE	1		
TCA	YES	SERINE	1	POLAR	3
والتواري والشراب بالمسادة فعما		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
CAA	YES	GLUTAMINE	1		
		TYROSINE	0		
ACA	YES	THREONINE	1		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	1
GAA	YES	GLUTAMIC ACID	1	NEGATIVE CHARGE (NEG)	
AAA	YES	LYSINE	1	IONIZABLE: BASIC	1
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
TAA	YES	STOP CODON	1	STOP SIGNAL (STP)	1
	12	10 Amino A	cids Are	NPL:POL:NEG:F	OS:STP =
		Represer	nted	6: 3: 1:	1: 1

TOTAL

5

TABLE 41

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
GGA	YES	GLYCINE	_1	NONPOLAR	3
GCA	YES	ALANINE	1	(NPL)	
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	C		
		TRYPTOPHAN	0		
CCA	YES	PROLINE	1		
TCA	YES	SERINE	1	POLAR	3
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
CAA	YES	GLUTAMINE	1		
		TYROSINE	0		
ACA	YES	THREONINE	1		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	1
GAA	YES	GLUTAMIC ACID	i	NEGATIVE CHARGE (NEG)	
AAA	YES	LYSINE	1	IONIZABLE: BASIC	3
CGA	YES	ARGININE	2	POSITIVE CHARGE	
AGA	YES			(POS)	
		HISTIDINE	0		
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TGA	YES			(STP)	
	12	9 Amino Ac	ids Are	NPL:POL:NEG:P	OS:STP =
		Represe			3: 2

TABLE 42. A, N, N

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	4
		ALANINE	0	(NPL)	
		VALINE	0		
		LEUCINE	0		
ATT	YES	ISOLEUCINE	3		
ATC	YES]			
ATA	YES				
ATG	YES	METHIONINE	1		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		
AGT	YES	SERINE	2	POLAR	8
AGC	YES			NONIONIZABLE	_
		CYSTEINE	0	(POL)	
AAT	YES	ASPARAGINE	2		•
AAC	YES				
		GLUTAMINE	0		
		TYROSINE	0		
ACT	YES	THREONINE	4		
ACC	YES				
ACA	YES				
ACG	YES				
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE	
	2000	1.00		(NEG)	
AAA AAG	YES YES	LYSINE	2	IONIZABLE: BASIC POSITIVE CHARGE	4
AGA	YES	LARCHINE		(POS)	
AGG	YES	ARGININE	2	(, 00)	
	X150	HISTIDINE	0		•
		STOP CODON	Ö	STOR GESTAY	
		STOT CODON	U	STOP SIGNAL (SIP)	0
	16	7 Amino Acids Are	Represented	NPL:POL:NEG:PO	S-SIP=
		,		4: 8: 0:	4: 0

TOTAL

5 TABLE 43. C, N, N

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	8
		ALANINE	0	(NPL)	
		VALINE	0		
CTT	YES	LEUCINE	4		
CTC	YES				
CTA	YES				
CTG	YES				
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCT	YES	PROLINE	4		
CCC	YES				
CCA	YES		4		
CCG	YES				
		SERINE	0	POLAR	2
		CYSTEINE	0	NONIONIZABLE	
		ASPARAGINE	0	(POL)	
CAA	YES	GLUTAMINE	2		
CAG	YES				
		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	Q
		GLUTAMIC ACID	0	NEGATIVE CHARGE	_
			_	(NEG)	
		LYSINE	0	IONIZABLE: BASIC	6
CGT	YES	ARGININE	4	POSITIVE CHARGE	
CGC	YES	-	1	(POS)	
CGA CGG	YES		1		
	YES				
CAT	YES	HISTIDINE	2		
UNC	YES				
		STOP CODON	0	STOP SIGNAL (STP)	0
	16	5 Amino Acids Are 1	Represented	NPL:POL:NEG:PO	
				8; 2; 0;	6: 0

TABLE 44. G, N, N

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	4	NONPOLAR	12
GGC	YES			(NPL)	
GGA	YES				
GGG	YES				
GCT	YES	ALANINE	4		
GCC	YES	_}	·		
GCA	YES				
GCG	YES				
GIT	YES	VALINE	4		
GTC	YES	7			
GTA	YES	7			
GTG	YES				
والتون فلقسندة والألا		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	Q
		CYSTEINE	0	NONIONIZABLE	_
		ASPARAGINE	0	. (POL)	
_	}	GLUTAMINE	0		
والتجاني فية الموسون بوانته الالباد		TYROSINE	0 .		
		THREONINE	0		
GAT	YEŞ	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES			NEGATIVE CHARGE	
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES				
		LYSINE	0	IONIZABLE: BASIC	0
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
		STOP CODON	0	STOP SIGNAL (SIP)	0
	16	5 Amino Acids Are R	Represented	NPL:POL:NEG:POS:STP = 12: 0: 4: 0: 0	

5 TABLE 45. T, N, N

TOTAL

DON	Represented	'AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	5
		ALANINE	0	(NPL)	
		VALINE	0		
TTA	YES	LEUCINE	2		
	YES				
		ISOLEUCINE	• 0		
دن اسمساندا کاک		METHIONINE	. 0		
TTT	YES	PHENYLALANINE	2		
TTC	YES				
TGG	YES	TRYPTOPHAN	1		
		PROLINE	0		
TCT	YES	SERINE	4	POLAR	8
TCC	YES			NONIONIZABLE	· ·
TCA	YES	3	(POL)		
TCG	YES				
TGT	YES	CYSTEINE	. 2		
TGC	YES				
		ASPARAGINE	0		
		GLUTAMINE	0		
TAT	YES	TYROSINE	2		
TAC	YES				
والمستخد		THREONING	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	. 0	IONIZABLE: BASIC	0
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
TAA	YES	STOP CODON	3	STOP SIGNAL	3
TAG	YES	,		(STP)	J
TGA	YES	7			
. 16		6 Amino Acids Are Represented		NPL:POL:NEG:POS:STP=	

· TOTAL

TABLE 46. A/C, N, N

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
		GLYCINE	0	NONPOLAR (NPL)	12
		ALANINE	0		
		VALINE	0		
CIT	YES	LEUCINE	4		
CTC	YES				
CTA	YES				
CIG	YES				
ATT	YES	ISOLEUCINE	3		
ATC	YES	·			
ATA	YES				
ATG	YES	METHIONINE	1		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCT	YES	PROLINE	4		
CCC	YES				
CCA	YES				
CCG	YES				
AGT	YES	SERINE	2	POLAR	10
	YES		_	NONIONIZABLE	
		CYSTEINE	0	(POL)	
AAT	YES	ASPARAGINE	2		
AAC	YES				
CAA	YES	GLUTAMINE	2		
CAG	YES	ODOTAME!			
		TYROSINE	0		
ACT	YES	THREONINE	-4		
ACC	YES		·		
ACA	YES				
ACG	YES				
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE	
AAA	YES	LYSINE	2	(NEG) IONIZABLE: BASIC	10
AAG	YES	DIOMED _	2	POSITIVE CHARGE (POS)	10
CGT	YES	ARGININE	6		
CGC	YES	- as the table	•		
CGA	YES				
CGG	YES				
AGA	YES				
AGG	YES				
CAT	YES	HISTIDINE	2		
CAC	YES				
		STOP CODON	0.	STOP SIGNAL (STP)	0

TOTAL 32 11 Amino Acids Are Represented NPL:POL:NEG:POS:STP = 12: 10: 0: 10: 0

TABLE 47. A

G, N, N CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	4	NONPOLAR (NPL)	16
GGC	YES				
GGA	YES				
GGG	YES				
GCT	YES	ALANINE	4		
GCC	YES				
GCA	YES				
GCG	YES				
GTT	YES	VALINE	4		
GTC	YES				
GTA	YES	1			
GTG	YES				
010		LEUCINE	0		
ATT	YES	ISOLEUCINE	3		
ATC	YES				
	YES	1			
ATA	YES	METHIONINE			
ATG	100	PHENYLALANINE	Ō		
		TRYPTOPHAN	0		
		PROLINE	0		
				POT AR	8
AGT	YES	SERINE	2	POLAR NONIONIZABLE (POL)	6
AGC	YES	CON COLUMN TO	^		
		CYSTEINE	0		
AAT		YES ASPARAGINE YES	2		
AAC	YES			ł	
		GLUTAMINE	. 0.	4	
		TYROSINE	0	4	
ACT	YES	THREONINE	4		
ACC	YES	4			
ACA	YES				
ACG	YES			TONING BY DE A CADAC	4
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES			NEGATIVE CHARGE (NEG)	
GAA	YES	GLUTAMIC ACID	2	(2.120)	
GAG	YES				
AAA	YES	LYSINE	2	IONIZABLE: BASIC	4
AAG	YES			POSITIVE CHARGE	
AGA	YES	ARGININE	2	(POS)	
AGG	YES			4	
		HISTIDINE	0		
		STOP CODON	0	STOP SIGNAL (STP)	0
32 12 Amino Acids Are Repre		e Represented	NPL:POL:NEG:P 16: 8: 4:	OS:STP = 4: 0	

TABLE 48. A/T, N, N

TOTAL

epres	sented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
		GLYCINE	0	NONPOLAR	9
_		ALANINE	0	(NPL)	
3737		VALINE	0	4	
YE	2S	LEUCINE	2		
YE					
YE	25	ISOLEUCINE	3		
YE	ES .				
YE	33				
YE	ZS	METHIONINE	1		
YE	A 19 19 19 19 19 19 19 19 19 19 19 19 19	PHENYLALANINE	2		
YE					
YE	كيسان ونصند	TRYPTOPHAN	1		
		PROLINE	0		
YE	20	SERINE	6	POLAR	16
YE			· ·	NONIONIZABLE	
YE		1		(POL)	
YE		1			
YE]			
YE	ES				
YE	ES	CYSTEINE	2		
YE					
YE	ES	ASPARAGINE	2		
YE	3S				
		GLUTAMINE	0		
YE		TYROSINE	2		
YE					
YE		THREONINE	4		
YE		4	1		
YE		-1			
YE	<u> </u>				
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
	- 	GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
YE	2S	LYSINE	2	IONIZABLE: BASIC	4
YE				POSITIVE CHARGE	
YE	ES .	ARGININE	2	(POS)	
YE					
		HISTIDINE	0		
YE	es	STOP CODON	3	STOP SIGNAL	3
YE	es		Ī	(STP)	
YE	es		•		
32	2	12 Amino Ac	cids Are	NPL:POL:NEG:F	OS:STP =

TABLE 49. C/G, N, N

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	4	NONPOLAR	20
GGC	YES			(NPL)	
GGA	YES	4			
GGG	YES				
GCT	YES	ALANINE	4		
GCC	YES	<u> </u>			
GCA	YES	_			
GCG	YES				
GTT	YES	VALINE	4		
GTC	YES	<u> </u>			
GTA	YES				
GTG	YES	7			
CIT	YES	LEUCINE	4		
CTC	YES				
CTA	YES]			
CTG	YES				
		ISOLEUCINE	0		
		METHIONINE	0_		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCT	YES	PROLINE	4		
CCC	YES				
CCA	YES	7]		
CCG	YES				
		SERINE	0	POLAR	2
		CYSTEINE	0	NONIONIZABLE	2
		ASPARAGINE	0	(POL)	
CAA	YES	GLUTAMINE	2		
CAG	YES		. —		
		TYROSINE	0		
		THREONINE	0		
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES		-	NEGATIVE CHARGE	*
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES		-	• · · · · · · · · · · · · · · · · · · ·	
		LYSINE	0	IONIZABLE: BASIC	
CGT	YES	ARGININE	4	POSITIVE CHARGE	6
CGC	YES	UNOTHER	. **	(POS)	
CGA	YES	1	ŀ	\- /	
CGG	YES				
CAT	YES	HISTIDINE	2		
CAC	YES				
		STOP CODON	0	STOP SIGNAL (STP)	0
	20	10 A 4	d. A		000
	32	10 Amino Aci		NPL:POL:NEG:PO	US:STP =
		Represent		20: 2: 4:	5: 0

TABLE 50. C/T, N, N

TOTAL

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequenc
		GLYCINE	0	NONPOLAR	13
		ALANINE	0	(NPL)	
		VALINE	0		
TTA	YES	LEUCINE	6		
TTG	YES	7			
CIT	YES				
CTC	YES				
CTA	YES	4			
CIG	YES				
		ISOLEUCINE	0		
		METHIONINE	0		
TTT	YES	PHENYLALANINE	2		
TTC	YES				
TGG	YES	TRYPTOPHAN	1		
CCT	YES	PROLINE	4		
CCC	YES				
CCA	YES	<u>]</u>			
CCG	YES				
TCT	YES	SERINE	4	POLAR	10
TCC	YES			NONIONIZABLE	40
TCA	YES]		(POL)	
TCG	YES			•	
TGT	YES	CYSTEINE	2		
TGC	YES				
		ASPARAGINE	0		
CAA	YES	GLUTAMINE	2		
CAG	YES				
TAT	YES	TYROSINE	2		
TAC	YES				
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE	
من مين سببكر				(NEG)	
		LYSINE	0	IONIZABLE: BASIC	6
CGT	YES	ARGININE	4	POSITIVE CHARGE	
CGC	YES			(POS)	
CGA	YES	1			
CGG	YES				
CAT	YES	HISTIDINE	2		
CAC	YES				
TAA	YES	STOP CODON	3	STOP SIGNAL	3
TAG	YES		Į.	(STP)	
TGA	YES]	1		
	32	10 Amino Ac	ide Are	NPL:POL:NEG:P	Oc.cmp -
	- F-4		TOP CHO		しり・ウィエ 二

70	A	n	T	17	~	1	C	r.	ъ	T	N	
11/	Д	к		.Н.	Э.	1	ľΥ	/ 1	. F	V.	IN	

T, N, N	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	4	NONPOLAR	17
GGC	YES	3		(NPL)	
GGA	YES	1			
GGG	YES				
GCT	YES	ALANINE	. 4		
GCC	YES				
GCA	YES				
GCG	YES				
GTT	YES	VALINE	4		
GTC	YES	1			
GTA	YES				
GTG	YES				
TTA	YES	LEUCINE	2		
TIG	YES				
		ISOLEUCINE	0		
المستدين بستورين		METHIONINE	0		
TIT	YES	PHENYLALANINE	2		
	YES		_		
TTC	YES	TRYPTOPHAN	1		
TGG	I ES	PROLINE	0		
			كالمستال بسيش	POLAR	8
TCT	YES	SERINE	4	NONIONIZABLE	6
TCC	YES	-		(POL)	
TCA	YES	-		()	
TCG		CYSTEINE	2		
TGT TGC	YES YES	CISTEMA			
100	1.137	ASPARAGINE	0		
		GLUTAMINE	0		
en A en	SEEM		2		
TAT	YES	TYROSINE	4		
TAC	YES	THREONINE	0		
				Y01777 4 67777	
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES			NEGATIVE CHARGE (NEG)	
GAA	YES	GLUTAMIC ACID	2	(razo)	
GAG	YES				
		LYSINE	0	IONIZABLE: BASIC	0
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
TAA	YES	STOP CODON	3	STOP SIGNAL	3
TAG	YES		•	(STP)	
		~			
TGA	YES				
	32	11 Amino A	cids Are	NPL:POL:NEG:I	POS:STP =
		Represen	-tod	17: 8: 4:	n· 3

TABLE 52. N. A. N

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
		GLYCINE	0	NONPOLAR	0
		ALANINE	0	(NPL)	
_======		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	6
		CYSTEINE	0	NONIONIZABLE	
AAT	YES	ASPARAGINE	2	(POL)	
AAC	YES				
CAA	YES	GLUTAMINE	2		
CAG	YES				
TAT	YES	TYROSINE	2		
TAC	YES				
		THREONINE	0	فالتبر والمتراز المتراز المتراز والمتراز والمتراز والمتراز والمتراز والمتراز والمتراز والمتراز والمتراز والمتراز	
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES			NEGATIVE CHARGE	
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES				
AAA	YES	LYSINE	2	IONIZABLE: BASIC	4
AAG	YES			POSITIVE CHARGE	
		ARGININE	0	(POS)	
CAT	YES	HISTIDINE	2		
CAC	YES		-0-000-5-A-VA		
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TAG	YES			(STP)	
	16	7 Amino Ac	ids Are	NPL:POL:NEG:I	POS:STP =
		Represe			4: 2

TABLE 5

CODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequenc
		GLYCINE	0	NONPOLAR	8
GCT	YES	ALANINB	. 4	(NPL)	
GCC	YES	·			
GCA	YES				
GCG	YES				
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANING	8		
		TRYPTOPHAN	0		
CCT	YES	PROLINE	4		
CCC	YES				
CCA	YES	7			
CCG	YES	7			
TCT	YES	SERINE	.4	POLAR	8
TCC	YES			NONIONIZABLE	
TCA	YES			(POL)	
TCG	YES				
		CYSTRINE	0		
		ASPARAGINE	0		
		GLUTAMINE	0		
		TYROSINE	0		
ACT	YES	THREONINE	4		
ACC	YES				
ACA	YES	-}			
ACG	YES				
والمساحة ووجيد الشفائل فالسادة الجرووور		ASPARTIC ACID	0	IONIZABLE: ACIDIC	G
		GLUTAMIC ACID	0	NEGATIVE CHARGE	
				(NEG)	
بسندي بهران المستعدد		LYSINE	0	IONIZABLE: BASIC	0
		ARGININE	0	POSITIVE CHARGE	
		HISTIDINE	0	(POS)	
		STOP CODON	0	Stop Signal (STP)	0
	16	4 Amino Ac	ids Are	NPL:POL:NEG:I	POS:STP =

TABLE 54. N, G, N

, G, N	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency)
GGT	YES	GLYCINE	4	NONPOLAR	5
GGC	YES]	ł	(NPL)	
GGA	YES	3			
GGG	YES				
		ALANINB	0	•	
-		VALINE	0		
		LEUCINB	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
TGG	YES	TRYPTOPHAN	1		
		PROLINE	0		
AGT	YES	SERINB	. 2	POLAR	4
AGC	YES	- 0224		NONIONIZABLE	
TGT	YES	CYSTEINE	2	(POL)	
TGC	YES	1 0.0.22.2			
		ASPARAGINE	0		
		GLUTAMINE	0		
		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	Ð
		والمراجع		NEGATIVE CHARGE	· ·
		GLUTAMIC ACID	0	(NEG)	
		LYSINE	0	IONIZABLE: BASIC	б
CGT	YES	ARGININE	6	POSITIVE CHARGE	
CGC	YES			(POS)	
CGA	YES				
CGG	YES]			
AGA	YES]			
AGG	YES				
		HISTIDINE	0		
TGA	YES	STOP CODON		STOP SIGNAL (STP)	1
	16	5 Amino Ac	ids Are	NPL:POL:NEG:F 5: 4: 0:	POS:STP = 6: 1

TABLE 55. N, T, N

TOTAL

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
		GLYCINE	0	NONPOLAR	16
		ALANINE	0	(NPL)	
GIT	YBS	VALINE	4		
GTC	YES				
GTA	YES				
GTG	YES		•		
TTA	YES	LEUCINE	6		
TIG	YES				
CIT	YES				
CTC	YES	<u> </u>	· ·		
CTA	YES	_}	į		
CTG	YES		<u> </u>		
ATT	YES	ISOLEUCINE	3		
ATC	YES	1 .	_i		
ATA	YES				
ATG	YES	METHIONINE	1		
TTT	YES	PHENYLALANINE	2		
TTC	YES				
		TRYPTOPHAN	ð		
		PROLINE	0		
		SERINE	O	POLAR	O
		CYSTEINE	Ö	NONIONIZABLE	•
		ASPARAGINE	0	(POL)	
		GLUTAMINE	0		
		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE	U
		CHOTAGE	V	(NEG)	
		LYSINE	0	IONIZABLE: BASIC	0
	رور بربری و مشکر با این برای این این این این این این این این این ا	ARGININE	0	POSITIVE CHARGE	_
		HISTIDINE	0	(POS)	
		STOP CODON		STOP SIGNAL	0
-0-000		1 0101 00D0N	0	(STP)	V
	16	5 Amino Acids Are		NPL:POL:NEG:PO	C.(CTP) —

TABLE 56. N, A/C, N

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
		GLYCINE	0	NONPOLAR	8
GCT	YES	ALANINE	4	(NPL)	
GCC	YES				
GCA	YES]			
GCG	YES		•		
		VALINE	Ò		
		LEUCINE	0		
	ISOLEUCINE 0	0			
		METHIONINE	0		
		PHENYLALANINE	0		
		TRYPTOPHAN	0		
CCT	YES	PROLINE	4		
CCC	YES				
CCA	YES				
CCG	YES				
TCT	YES	SERINE	4	POLAR	14
TCC	YES			NONIONIZABLE	•
TCA	YES]		(POL)	
TCG	YES				
		CYSTEINE	0		
TAA	YES	ASPARAGINE	2		
AAC	YES				
CAA	YES	GLUTAMINE	2		
CAG	YES				
TAT	YES	TYROSINE	2		
TAC	YES				
ACC	YES	THREONINE	4		
ACC ACA	YES YES	1	,		
ACG	YES	1	·		
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES	ADLAKTIC ACID	4	NEGATIVE CHARGE	4
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES		~	` -	
AAA	YES	LYSINE	2	IONIZABLE: BASIC	4
AAG	YES	DIONA	2	POSITIVE CHARGE	7
	220	ARGININE	0	(POS)	
CAT	YES	HISTIDINE	.2		
CAC	YES				1_
TAA	YES	STOP CODON	2	STOP SIGNAL	2
		1 3101 600017	-	(STP)	2
TAG	YES				
	32	11 Amino Ad Represer		NPL: POL: NEG: 8: 14: 4:	POS: STP 4: 2

WO 02/092780 PCT/US02/15767

TABLE 57. N, A/G, N

TOTAL

ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	4	NONPOLAR	5
GGC	YES	3		(NPL)	
GGA	YES				
GGG	YES				
		ALANINE	0		
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0	Pro-	
		PHENYLALANINE	0		
TGG	YES	TRYPTOPHAN	1		
		PROLINE	0		
AGT	YES	SERINE	2	POLAR	10
AGC	YES		-	NONIONIZABLE	40
TGT	YES	CYSTEINE	2	(POL)	
TGC	YES		"	-	
AAT	YES	ASPARAGINE	2		
AAC	YES				
CAA	YES	GLUTAMINE	2		
CAG	YES		-	7	
TAT	YES	TYROSINE	2		
TAC	YES	1			
		THREONINE	0		
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES			NEGATIVE CHARGE	
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES				
AAA	YES	LYSINE	2	IONIZABLE: BASIC	10
AAG	YES			POSITIVE CHARGE	
CGT	YES	ARGININE	6	(POS)	
CGC	YES]			
CGA	YES		İ		
CGG	YES	1	1		
AGA	YES				
AGG	YES				
CAT	YES	HISTIDINE	2		
CAC	YES				
TAA	YES	STOP CODON	3	STOP SIGNAL	3
TAG	YES			(STP)	
TGA	YES	1			
	32	12 Amino Ac		NPL: POL: NEG: 1	

TABLE 58. N, A/T, N

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequen
		GLYCINE	0	NONPOLAR	16
		ALANINE	0	(NPL)	
GTT	YES	VALINE	4		
GTC	YES				
GTA	YES				
GTG	YES				
TTA	YES	LEUCINE	6		
TTG	YES				
CTT	YES				
CIC	YES				
CTA	YES	4			
CTG	YES				
ATT	YES	ISOLEUCINE	3		
ATC	YES	4			
ATA	YES				
ATG	YES	METHIONINE	11		
TTT	YES	PHENYLALANINE	2		
TTC	YES				
		TRYPTOPHAN	0		
		PROLINE	0		
		SERINE	0	POLAR	6
		CYSTEINE	0	NONIONIZABLE	
AAT	YES	ASPARAGINE	2	(POL)	
AAC	YES				
CAA	YES	GLUTAMINE	2		
CAG	YES				
TAT	YES	TYROSINE	2		
TAC	YES				
		THREONINE	0		
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES			NEGATIVE CHARGE	
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES				
AAA	YES	LYSINE	2	IONIZABLE: BASIC	4
AAG	YES		المستخدات المراجعة بالمراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة	POSITIVE CHARGE	•
a		ARGININE	0	(POS)	
CAT	YES	HISTIDINE	2		
CAC	YES				
TAA	YES	STOP CODON	2	STOP SIGNAL	2
TAG	YES			(STP)	
-	32	12 Amino Ac	ride Ara	NPL: POL: NEG:	POS-STP
	Ju		ALLO AMO	16: 6: 4:	4: 2

TABLE 59. N, C/G, N

N, C/G, N	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	4	NONPOLAR	13
GGC	YES			(NPL)	
GGA	YES				
GGG	YES				
GCT	YES	ALANINB	4		
GCC	YES_				
GCA	YES]			
GCG	YES				
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
		PHENYLALANINE	0		
TGG	YES	TRYPTOPHAN	1		
CCT	YES	PROLINE	4		
CCC	YES		т		
CCA	YES			1	
CCG	YES				
TCT		SERINE	6	POLAR	12
TCC	YES YES	SERINE	•	NONIONIZABLE	12
TCA	YES	-		(POL)	
TCG	YES	-			
AGT	YES			•	
AGC	YES				
TGT	YES	CYSTEINE	2		
TGC	YES				
		ASPARAGINE	0		
		GLUTAMINE	0		
		TYROSINE	0		
ACT	YES	THREONINE	4		
ACC	YES		1		
ACA	YES]			
ACG	YES				
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	6
CGT	YES	ARGININE	6	POSITIVE CHARGE	
CGC	YES		_	(POS)	
CGA	YES]			
CGG	YES	1	į		
AGA	YES		1		
AGG	YES				
		HISTIDINE	0		
TGA	YES	STOP CODON	1	STOP SIGNAL (STP)	1
	32	8 Amino Aci	ds Are	NPL: POL: NEG:	POS: STP
		Represen	ted	13: 12: 0:	6: 1

TABLE 60. N, C/T, N

DDON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
		GLYCINE	0	NONPOLAR	24
GCT	YES	ALANINE	4	(NPL)	
GCC	YES				
GCA	YES				
GCG	YES				
GTT	YES	VALINE	4		
GTC	YES	1			
GTA	YES	1			
GTG	YES				
TTA	YES	LEUCINE	6		
TTG	YES				
CIT	YES]			
CTC	YES		<u> </u>		
CTA	YES	4			
CTG	YES				
ATT	YES	ISOLEUCINE	3		
ATC	YES	4			
ATA	YES				
ATG	YES	METHIONINE	1		
TTT	YES	PHENYLALANINE	2		
TTC	YES				
		TRYPTOPHAN	0		
CCT	YES	PROLINE	4		
CCC	YES	_		•	
CCA	YES				
CCG	YES				
TCT	YES	SERINE	4	POLAR	8
TCC	YES]		NONIONIZABLE	
TCA	YES			(POL)	
TCG	YES				
		CYSTEINE	0		
		ASPARAGINE	0		
		GLUTAMINE	00		
		TYROSINE	0		
ACT	YES	THREONINE	4		
ACC	YES	_			
ACA	YES	-			
ACG	1.53	1 400 4 5000		TOLDER A DIV SOL A COMPA	0
···		ASPARTIC ACID	0	IONIZABLE: ACIDIC NEGATIVE CHARGE	V
	1	GLUTAMIC ACID	0	(NEG)	
	 	LYSINE	0	IONIZABLE: BASIC	0
		ARGININE	0	POSITIVE CHARGE	V
		HISTIDINE	0	(POS)	
			صناب المسلم المراب		^
		STOP CODON	0	STOP SIGNAL (STP)	0
	32	9 Amino Ac	cids Are	NPL: POL: NEG:	POS: STP
	₩	Represe		24: 8: 0:	

TOTAL 32 9 Amino Acids Are NPL: POL: NEG: POS: STP Represented 24: 8: 0: 0: 0

TA	BI	Æ	61.	N.	G/T,	N
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ODON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINB	4	NONPOLAR	21
GGC	YES		•	(NPL)	
GGA	YES				
GGG	YES				
التاريخ والمساوات والمساور		ALANINE	0		
GTT	YES	VALINE	4		
GTC	YES	1			
GTA	YES	1		_	
GTG	YES	1		1	
TTA	YES	LEUCINE	6		
TIG	YES				
CIT	YES	1	•		
CTC	YES	7	Δ		
CTA	YES	7			
CTG	YES				
ATT	YES	ISOLEUCINE	3		
ATC	YES	1			
ATA	YES				
ATG	YES	METHIONINE	1		
TIT	YES	PHENYLALANINE	2		
	YES	111111111111111111111111111111111111111	-		
TTC		TRYPTOPHAN	i		
TGG	YES		0		
		PROLINE		707.47	4
AGT	YES	SERINE	2	POLAR NONIONIZABLE	4
AGC	YBS			(POL)	
TGT	YES	CYSTEINE	2	(1 OD)	
TGC	YES				
		ASPARAGINE	0		
	المراجات ا	GLUTAMINE	0.		
		TYROSINE	0		
		THREONINE	0		
		ASPARTIC ACID	0	IONIZABLE: ACIDIC	0
		GLUTAMIC ACID	0	NEGATIVE CHARGE (NEG)	
		LYSINE	0	IONIZABLE: BASIC	6
CGT	YES	ARGININE	6	POSITIVE CHARGE	
CGC	YES	• 102-004 104 104	Ť	(POS)	
CGA	YES	7			
CGG	YES	7			
AGA	YES			_	
AGG	YES			· ·	
		HISTIDINE	0		
TGA	YES	STOP CODON	1	STOP SIGNAL	1
		5101 000011	*	(STP)	
	32	10 Amino A	cids Are	NPL: POL: NEG:	POS: STP
		Represe		21: 4: 0:	_

TABLE 62.

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
GGT	YES	GLYCINE	4	NONPOLAR	13
GGC	YES]		(NPL)	
GGA	YES]			
GGG	YES				
GCT	YES	ALANINE	4		
GCC	YES				
GCA	YES				
GCG	YES	1			
		VALINE	0		
		LEUCINE	0		
		ISOLEUCINE	0		
		METHIONINE	0		
7		PHENYLALANINE	0		
TGG	YES	TRYPTOPHAN	1		
CCT	YES	PROLINE	4		
		- PROLINE	*		
CCC	YES				
CCA	YES				
CCG	YES		أحصيت		
TCT	YES	SERINE	6	POLAR	18
TCC	YES	4		NONIONIZABLE	
TCA	YES			(POL)	
TCG	YES	4			
AGT AGC	YES YES				
ويجهين ويرضوا الأناف		C2 20 (mars) 202			
TGT TGC	YES	CYSTEINE	2		•
	YES	100404000			
AAT	YES	ASPARAGINE	2		
AAC	YES	GI TIMAN AND THE			
CAA CAG	YES YES	GLUTAMINE	2		
TAT		TOODDO			
TAC	YES YES	TYROSINE	2		
ACT		TIDEONING			
ACC	YES YES	THREONINE	4		
ACA	YES	1			
ACG	YES	1	1		
الرواي المراجعة المراجعة		ACDARWO ACID		TOURS A THE SELECTION	
GAT GAC	YES YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC NEGATIVE CHARGE	4
	// 	CT TURA SECT A CUE		(NEG)	
GAA GAG	YES YES	GLUTAMIC ACID	2	(LILO)	
		V 42700 000			
AAA	YES	LYSINE	2	IONIZABLE: BASIC	10
AAG	YES	42000000		POSITIVE CHARGE	
CGT	YES	ARGININE	6	(POS)	
CGC CGA	YES	1	. [
CGG	YES YES	+			
AGA	YES	4			
AGG	YES	1			
CAT	YES	HISTIDINE	2		
CAC	YES		-		
		Oron con co			
TAA	YES	STOP CODON	3	STOP SIGNAL	3
TAG	YES	1	<u> </u>	(STP)	
TGA	YES				

TOTAL Represented 13: 18: 4: 10: 3 TABLE 63.

DON	Represented	AMINO ACID	(Frequency)	CATEGORY	(Frequency
		GLYCINE	0	NONPOLAR	24
GCT	YES	ALANINE	4	(NPL)	
GCC	YES				
GCA	YES]			
GCG	YES				
GTT	YES	VALINE	4		
GTC	YES				
GTA	YES			i	
GTG	YES	1			
TTA	YES	LEUCINE	6		
TTG	YES				
CIT	YES		/		
CTC	YES				
CTA	YES	4			
CTG	YES				
ATT	YES	ISOLEUCINE	3		
ATC	YES	4			
ATA	YES				
ATG	YES	METHIONINE	1		
TTT	YES	PHENYLALANINE	2		
TTC	YES				
		TRYPTOPHAN	0		
CCT	YES	PROLINE	4		
CCC	YES				
CCA	YES				
CCG	YES				
TCT	YES	SERINE	4	POLAR	14
TCC	YES			NONIONIZABLE	
TCA	YES]		(POL)	
TCG	YES				•
		CYSTEINE	0		
AAT	YES	ASPARAGINE	2		
AAC	YES				
CAA	YES	GLUTAMINE	2		
CAG	YES	TEN CONTE			
TAT	YES	TYROSINE	2		
يظنكول ووماكيا أيتان	YES	THERMAIN			•
ACT ACC	YES YES	THREONINE	4		
ACA	YES	1			
ACG	YES	7			
GAT	YES	ASPARTIC ACID	2	IONIZABLE: ACIDIC	4
GAC	YES	LINE THE TOTAL	4	NEGATIVE CHARGE	~
GAA	YES	GLUTAMIC ACID	2	(NEG)	
GAG	YES				
AAA	YES	LYSINE	2	IONIZABLE: BASIC	4
AAG	YES		44	POSITIVE CHARGE	~
		ARGININE	0	(POS)	
CAT	YES	HISTIDINE	2		
CAC	YES	1 ************************************	2.		
TAA	YES	STOP CODON	2	COOD CICATAT	2
		1 STOP CODON	. 4	STOP SIGNAL (STP)	4
TAG	YES			13161	

TOTAL Represented